

Virtual Force

NAME _____

DATE _____

<http://phet.colorado.edu/en/simulation/forces-and-motion-basics>

For this portion of the lab exercise you will use simulations (Sims) to explore the interaction of forces. Once you are finished responding to the items in each Sim please feel free to explore several functions by changing variables, forces, etc.

TUG OF WAR:

1. PREDICT! What do you think will happen when you put equal sized figures on opposite sides of the cart, one at the last knot and one at the closest knot?
2. EXPLORE: Place equal-sized figures on opposite sides- one close to the cart and the other far from the cart. What happens?
3. EXTEND: Use several combinations of figures on either side of the cart and observe how the force and motion is affected. What is the relationship between the sum of forces and direction of motion?
4. Check the boxes that say “Sum of Forces” and “Values” and repeat #3. What do you observe?

MOTION:

Check the boxes in the top right of the screen.

1. PREDICT: What will happen when you push the cart at max speed?
2. EXPLORE: Have the figure apply a constant force of 500N until you reach max speed. What happens?
3. PREDICT: What do you think will happen when you apply a constant 100N force until you reach max speed? Will the figure face-plant or maintain his position?

4. EXPLORE: Apply a 100N force until he reaches max speed. What happened?

5. EXTEND: Use several combinations of force and mass and observe the results. Explain several of your observations below:

ACCELERATION

Check all of the boxes

1. Pick several different objects and identify the force necessary to start it moving (Break the force of friction). List the object, its' mass and the force needed to START it moving:

Object_____ Mass_____ Force_____ (friction)

Object_____ Mass_____ Force_____

Object_____ Mass_____ Force_____

2. Use the cup of water and push it with several different forces. What happens to the fluid in the cup? Use the term "inertia" in your response.
3. Adjust the friction to none and apply a small force. What do you notice about the force applied and the sum of forces?
4. Adjust the friction to lots and apply a larger force. What do you notice about the force due to friction when compared to #1?

5. Use several different combinations of force and mass and friction in order to observe the effects. List several observations: